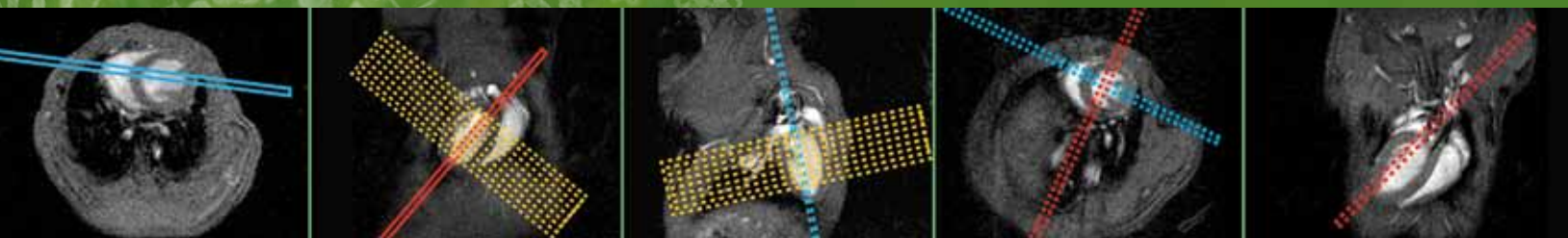




Agilent nScope eMRI Applications for Pre-Clinical Research

ACCESSIBLE MRI METHODS: MOUSE CARDIAC PILOTING

The Measure of Confidence



Agilent Technologies

ACHIEVE LONG AND SHORT AXIS VIEWS OF THE MOUSE HEART IN JUST A FEW SIMPLE STEPS

Designed for novice and expert cardiac researchers, the Agilent nScope eMRI uses simple, precise positioning of double oblique planes to deliver sophisticated mouse cardiac images. The Agilent Cardiac Pack makes it easy for first-time or sophisticated users to carry out cardiac piloting and function assessment to address their imaging needs.

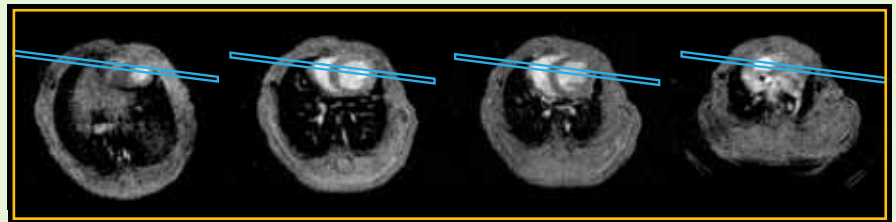
Just a Few Steps for Impressive Images of the Mouse Cardiac Axes.⁵

Agilent's Cardiac Pack features pre-selected, laboratory-tested protocols that work in the background to make complex image acquisition easy for first time users.

Step 1

After an initial scout scan to confirm heart position, acquire ~ 4 scans in axial orientation and run autoshim.

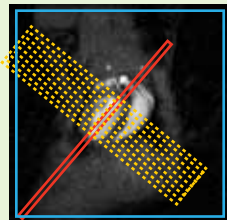
Initial scout with overlay (Blue) indicating the orientation of the next pilot scan.



Step 2

On the axial slices, prescribe a coronal slice and place it through the left and right ventricles as indicated in Step 1.

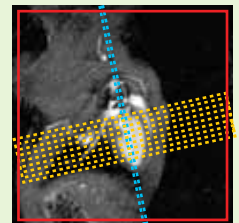
Oblique coronally-oriented scout overlaid with an oblique sagittally-oriented scout (Red) and short-axis stack (Yellow) prescriptions.



Step 3

Oblique sagittally-oriented scout overlaid with the short-axis stack (Blue) and the four-chamber view (Yellow) prescriptions.

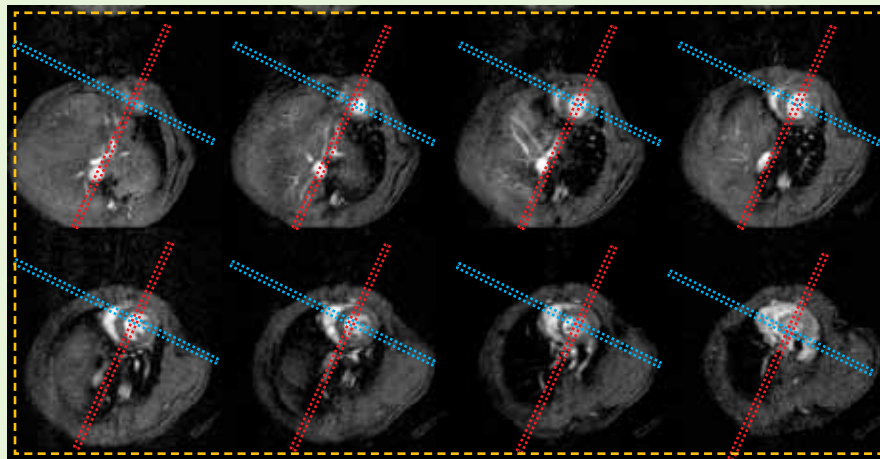
Oblique sagittally-oriented scout overlaid with the short-axis stack (Yellow) and the four-chamber view (Blue) prescriptions.



Step 4

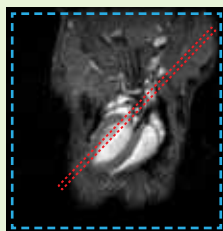
The short-axis (SA) piloting is obtained by placing a stack of slices perpendicular to the oblique coronal slice in Step 2 and perpendicular to the axis that connects the apex and the base of the left ventricle in Step 3.

Short-axis oriented slices covering the heart left ventricle from the apex (top left) to the base (Bottom right) with four-chamber view (Blue) and the two-chamber view (Red) prescriptions overlaid. Usually 8-10 slices of 1 mm thickness will cover the entire left ventricle.



Step 5

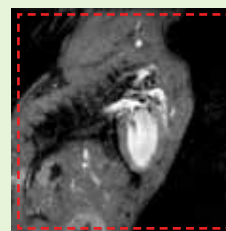
For the long-axis four-chamber view, prescribe a slice orthogonal to the sagittal scout in Step 3, through the base and apex of the heart, and perpendicular to the short axis through the right and left ventricle in Step 4 (Blue line).



Long-axis four-chamber view with two-chamber view overlaid (Red).

Step 6

To scan the long-axis two-chamber view, the slice used for the four-chamber view on the short axis (Red line in Step 4) is rotated by 90 ° and oriented through the apex and outflow tract of the heart (Red line in Step 5)



Long-axis two-chamber view of the mouse heart.

Notes and Acknowledgments

1. Step 1-6 images have been acquired using the Agilent Cardiac Pack with the following parameters: segmented ECG triggered gradient echo sequence, tagcine, single frame, 8 views per segment, matrix 128 x 128 (zero filled to 256 x 256), acquisition time per slice ~ 4 s (2 averages), at a heart rate of 120-130 ms.
2. Images are provided courtesy of King's College London and have been acquired using the following magnet specifications: 7T, with a 205/120 gradient set (60 Gauss/cm – 200 μ s rise time), Tx/Rx volume coil (39 cm inner diameter).
3. These instructions for mouse cardiac piloting methodology are valid for all field strengths and all RF coil configurations.
4. When performing a cardiac study, a triggering signal synchronous with the ECG of the animal must be provided to the scanner by an appropriate monitoring system.
5. Schneider, J.E., *Methods Mol Biol.*, **2011**, 771:387-405.

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